

The PinPoint™ Solution

Intelligent
Machine Tending

Ver. 2.0



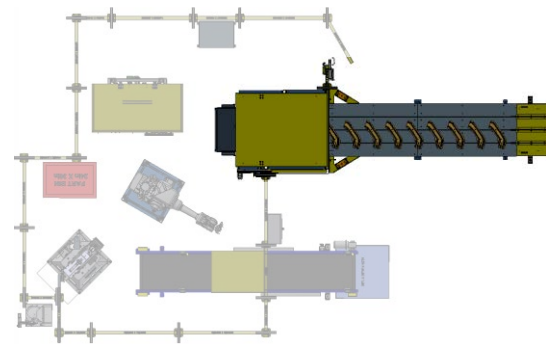
CenterLine (Windsor) Limited

CENTERED ON SOLUTIONS

The PinPoint™ Solution

An effective machine tending solution needs to ensure there is an uninterrupted supply of workpieces.

With its integrated intelligence, the PinPoint verifies the workpiece and its orientation. Non-conforming workpieces are bypassed to continue production without interruption.



The PinPoint, a key enabler of CenterLine's industry leading High-Speed Fastener (HSFS) welding cell, provides:

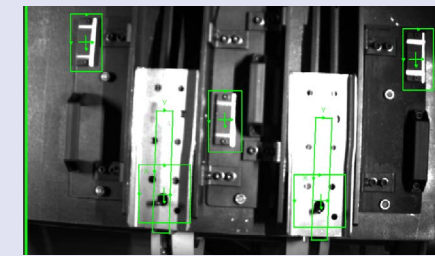
- consistent manual loading of workpieces into a robotic cell having a takt time as low as 2.5 seconds
- efficient use of capital to weld fasteners to a variety of short run assemblies
- automatic fault identification and recovery for maximum operational effectiveness

The PinPoint™ Process



Simplified Loading

Operator positions workpieces onto the drive pins in an approximate orientation. As the drive pin drags the workpieces along the work surface, the drag motion orients them.



Workpiece Verification

The integrated vision system verifies the workpiece is accepted, i.e. correct part, in the correct position and orientation.



Accurate Placement

Once verified workpieces are picked by a robot inside the cell, the drive pins advance more workpieces into position. Rejected workpieces are discarded into the Reject Chute or Bin.

The PinPoint™ Advantages

Minimal Changeover

The PinPoint can be configured to **transfer a variety of workpieces individually, as pairs, or as sets**. As the workpiece is dragged from the load position towards the robot, **the drag action of the PinPoint establishes a consistent orientation**. A custom guide tool may be employed at the unload station for final position refinement so it can be more accurately inspected or gripped with the robot end effector.

Optimum Cadence

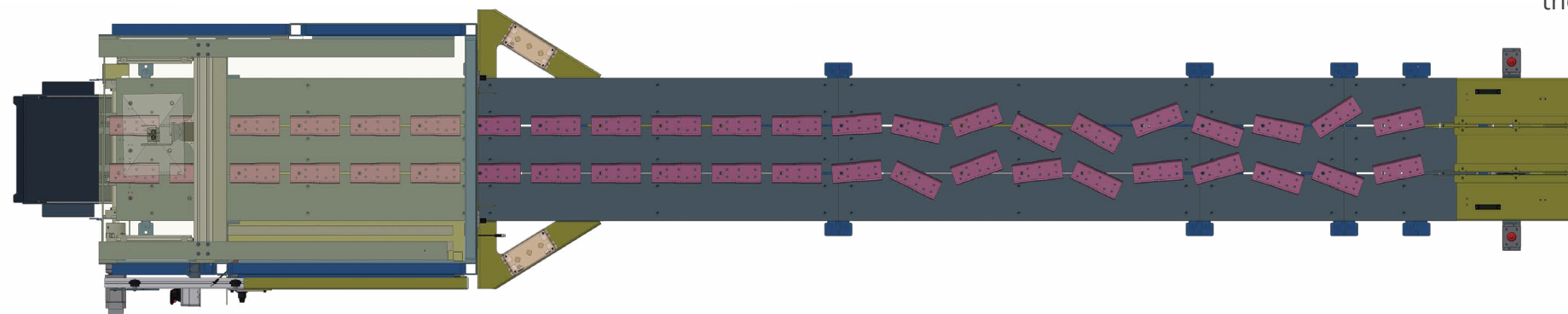
The operator can easily see from a distance when parts need to be loaded, providing **flexibility for the operator to tend more than one machine at a time allowing optimum cadence**. There is less operator stress, greater productivity, and more time to monitor production and workpiece quality.

Standard Configurations

The PinPoint Solution is configured with common components and features to promote standardization. **Each customer can establish standard configurations** and a control/program configuration that addresses their business objectives, production expectations and technical proficiency.

Process Automation

The PinPoint facilitates inspection and error recovery to maximize operational effectiveness. When the **image analysis system identifies a workpiece issue, the workpiece can be discharged to a reject chute or bin, as a new workpiece is advanced to the pick position**. One or more inspection cameras may be used to confirm workpiece features and attributes such as the existence of holes, welds, or required markings. The camera(s) are also used confirm the correct guide tool is properly positioned.



Productivity

New workflow opportunities become possible when complex change overs are eliminated, and the **operator can establish an optimum load cadence instead of trying to work in lock step with the machine sequence**. PinPoint is a game changer requiring fewer operators and improved operational effectiveness by reduced micro stoppages.

Modularity

The modular design of the PinPoint Solution enables the designer to **specify the optimum length, number of lanes, and drive pin spacing**. They optimize the use of floorspace for workpiece buffer leaving room for material staging. PinPoint can be accessed from either side to give the operator freedom to circulate between multiple systems or improve material handling activities.

Health and Safety

PinPoint can be configured based on ergonomic considerations such as workpiece size, weight, working height and operator reach. **The operator is not restricted to a specific motion to a specific location, which reduces the strain of repetitive motion**.

PinPoint is fully guarded, and the operator is not

exposed to pinch points as the drive pin loosely interacts with a workpiece. The workpiece is moved at a controlled rate by the drive pins that push/pull the workpiece towards the pick station. The interlocked barrier guard halts the drive pin motion in the event an interference.

The PinPoint™ Solution Specifications

Integrated Stand-alone Vision System

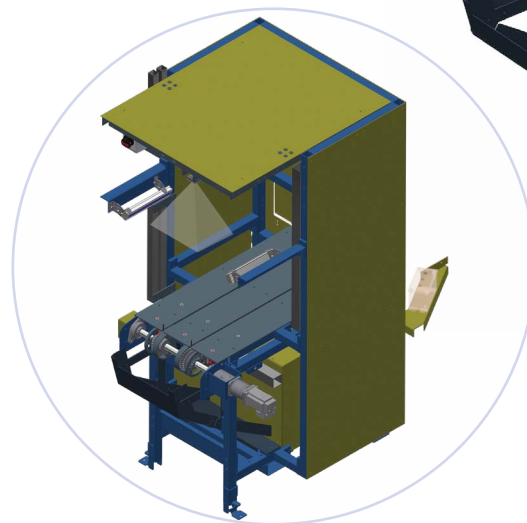
Up to four (4) cameras with integrated lighting and shrouding to ensure quality images to validate workpieces type and position for robotic pick-up.



Drive Pins Ø 6mm
30mm - 100mm (10mm increments)

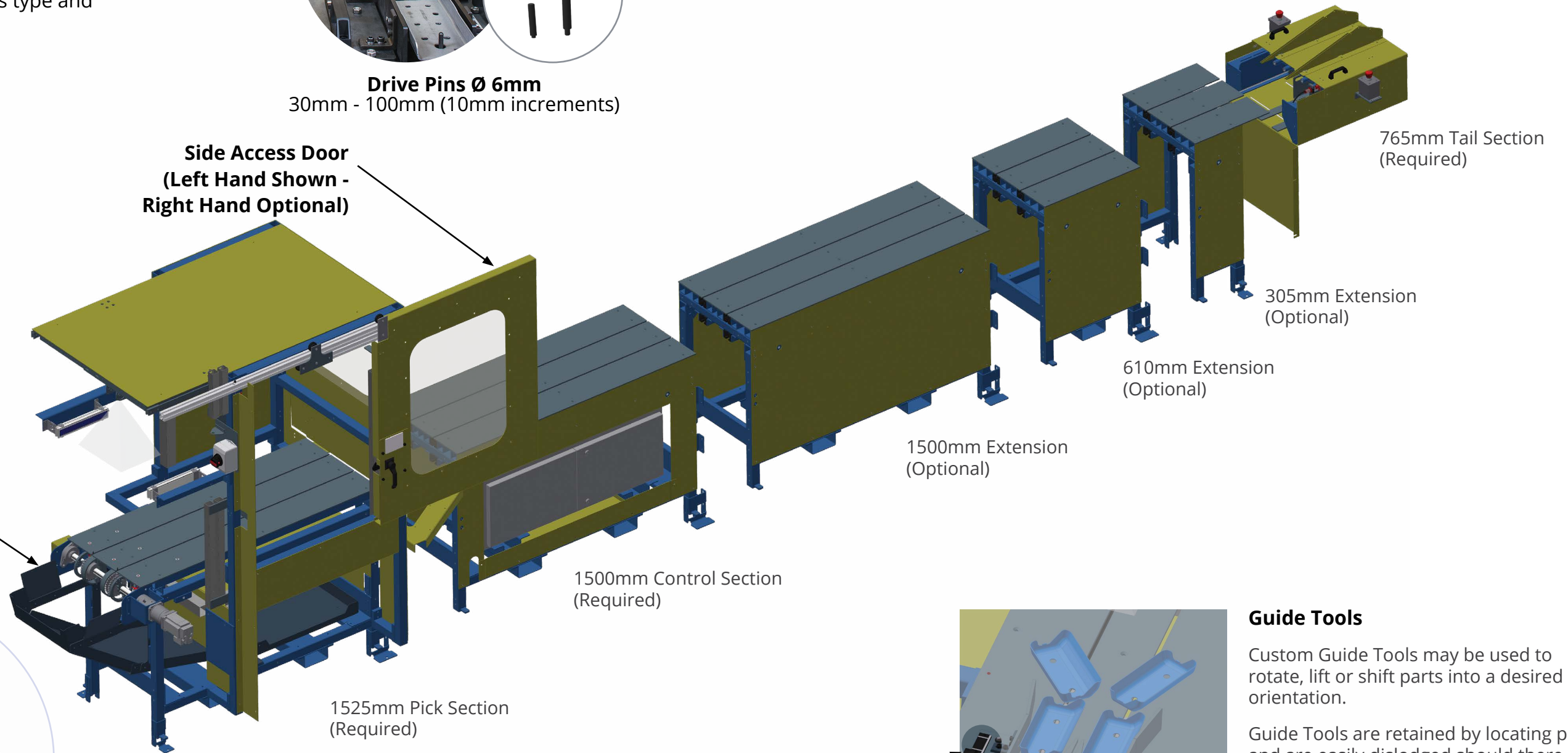
Side Access Door
(Left Hand Shown -
Right Hand Optional)

Reject Chute (Optional)



Optional 1125mm Short Pick Section

Side Access Door not available
Workpiece guide tool changed from inside the cell
Changeover requires part run-out
Not suitable for large workpieces

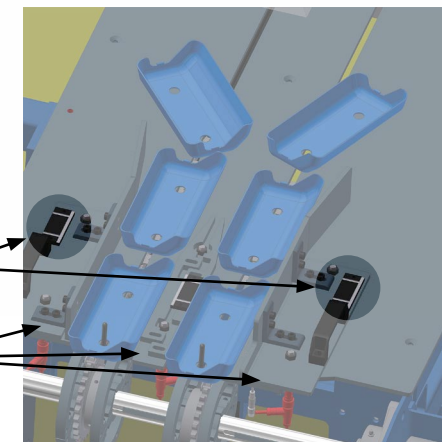


Configurable Options

- Lanes** Available with 1-4 lanes
 - Pin Pitch** Pin Pitches available in 50mm (2") increments
 - Lengths** Minimum length 3800mm (10') and maximum length 6100mm (20')
 - Widths** Available in standard widths of 600mm, 900mm and 1200mm
- Custom configurations are available upon request.**

Guide Tool ID Tag

Guide Tool



Guide Tools

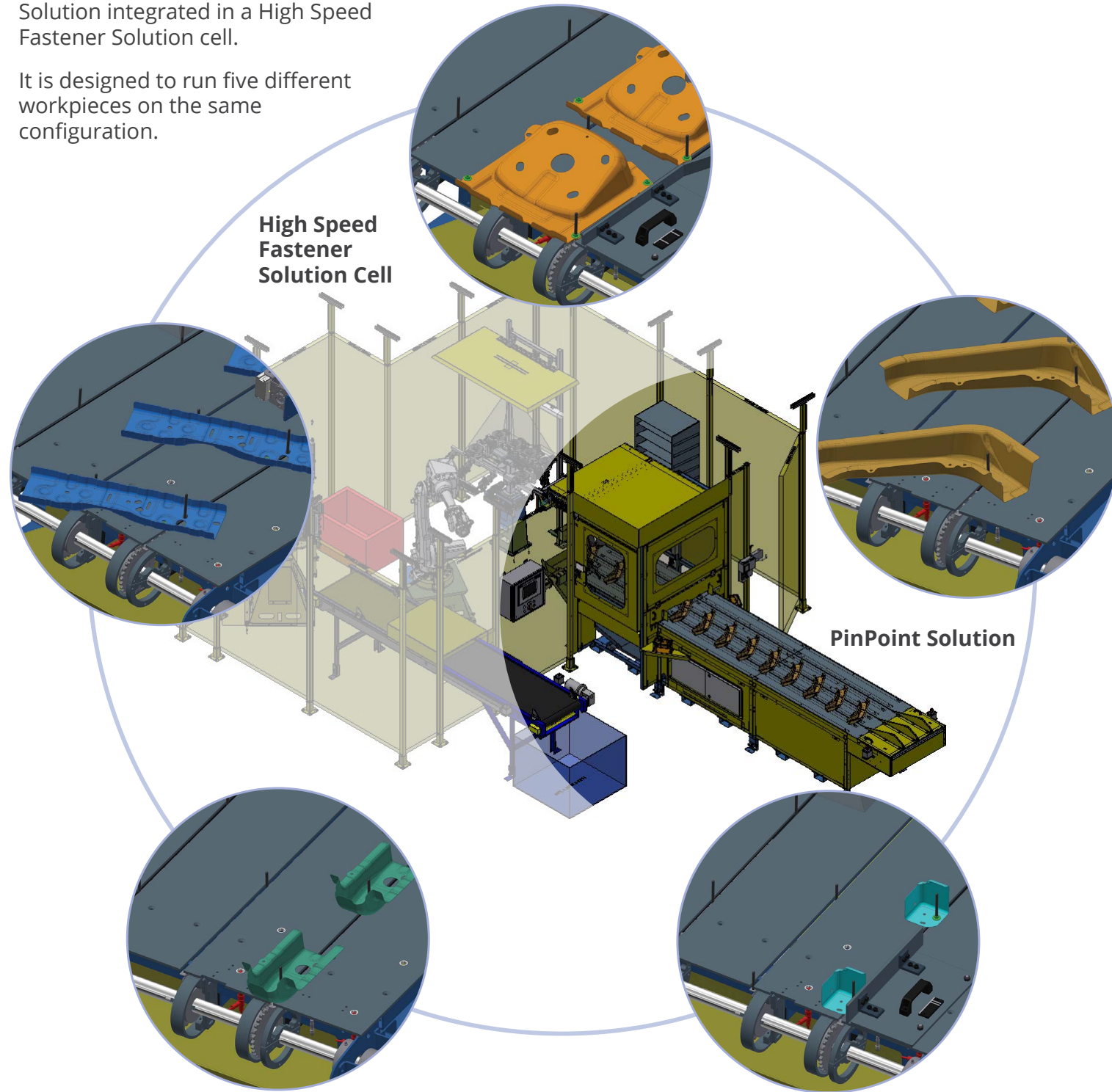
Custom Guide Tools may be used to rotate, lift or shift parts into a desired pick orientation.

Guide Tools are retained by locating pins and are easily dislodged should there be interference. The Vision System may be used to confirm the required Guide Tool is correctly positioned.

The PinPoint™ Solution

Below is an example of a PinPoint Solution integrated in a High Speed Fastener Solution cell.

It is designed to run five different workpieces on the same configuration.



“Our production through-put has increased 15% using the PinPoint to buffer parts, our robotic weld lines no longer experience micro stoppages, the line continues to run into breaks and lunches.” *Tier One Customer*

Modularity

CenterLine can configure a PinPoint Solution to meet production requirements.

The solution is supplied completely tested with production workpieces and simple instructions for system integration.

Some PinPoint Solution applications:

- CNC Machine Tending
- Build-in-sequence Traceability & Error Proofing
- Robotic Pack-out Cells
- Plastic Parts Post Processing

PinPoint Solution Application Process

Step 1: Required from Customer

- Math data of all workpieces or samples.
- Desired workpiece orientation.
- How will parts be picked up? (Robot or other)
- Side Access Door Left Hand or Right Hand?
- Standard or Short Pick Section? Note: Short Pick Section requires a safety review.
- Include Reject Chute?
- Expected takt cycle time.
- Requested buffer time or workpiece count.
- Configured overall Length.

Step 2: CenterLine to provide to Customer

- Configuration proposal with approximate spacing and orientation of workpieces.
- Simplified step file.
 - Length and width of entire PinPoint Solution.
 - Length of Loading Zone.
 - Number of workpieces on entire length of work surface.
 - Number of workpieces in Loading Zone.
- How the parts will be loaded and oriented.
- Quotation





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